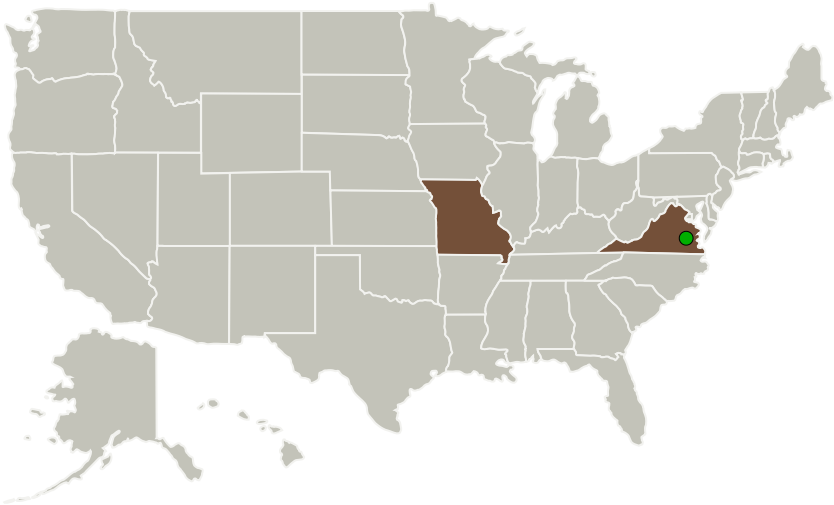
A Software Tool for Improved Noise Source Identification and Understanding, Phase I

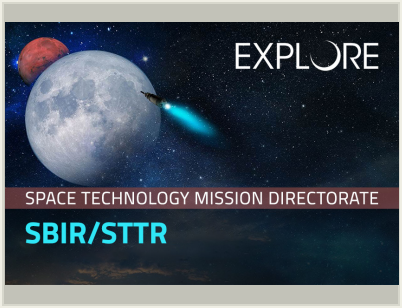
Completed Technology Project (2010 - 2010)

Project Introduction

Innovative Technology Applications Company and Drs. P. Morris and K. Brentner will make improvements in noise prediction and measurement methods for subsonic and supersonic vehicles. Possible areas of application for the finished product include aerodynamic noise from fans, jets, turbomachinery, engine cores, propfans, propellers, and airframe components. The proposed Phase I work will result in a proof-of-concept demonstration of a tool which will enable the NASA customer to gain deeper insight into aerodynamic noise sources and develop improved methods for experimentally detecting them. Ultimately, this will enable improved source identification techniques and greater understanding of the physics associated with the data obtained from experimental phased array microphone arrays. The approach taken by the proposed work to accomplish these goals is to use an unsteady simulation of nearfield unsteady flow to feed a Ffowcs Williams-Hawking solver. The acoustic field is then propagated to a numerical phased array of microphones and the data recorded just as it would in a wind tunnel or flyover experiment. The data is then processed according to the state-of-the-art data reduction methods and the resulting predictions of noise sources compared to the detailed data from the unsteady simulation to gain additional insight.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Innovative Technology Applications Co.	Lead Organization	Industry	Chesterfield, Missouri
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Missouri	Virginia

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138764)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Technology Applications Co.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

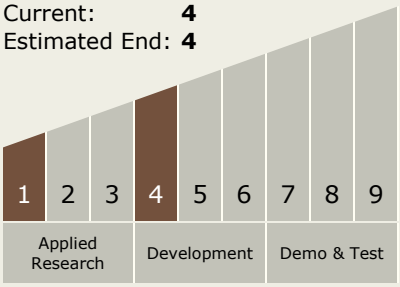
Carlos Torrez

Principal Investigator:

Christopher C Nelson

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.4 Aeroacoustics

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System